

CLAIMS

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1. A catalyst composition for the hydrodesulfurization and isomerization of a light hydrocarbon oil, comprising a support comprising zirconium oxide or a zirconium hydroxide; from 1 to 3 wt% sulfuric acid radicals in terms of a sulfur amount based on the total weight of the catalyst composition; and (1) from 0.05 to 10 wt% palladium, (2) from 0.05 to 10 wt% palladium and from 0.05 to 10 wt% platinum, or (3) from 0.05 to 10 wt% nickel, based on the total weight of the catalyst composition; and having a specific surface area of from 50 to 150 m²/g after stabilization by burning at a temperature of from 550 to 800°C.

2. The catalyst according to claim 1, wherein the ratio of the platinum to the palladium (Pt/Pd atomic ratio) is from 0.1 to 4.

3. A process for producing the catalyst composition of claim 1, comprising:

(1) treating a zirconium hydroxide with a substance giving sulfuric acid radicals; impregnating the resultant treated material with a palladium compound, a palladium compound and a platinum compound, or a nickel compound; and

burning the impregnated material at a temperature of from 550 to 800°C;

(2) treating a zirconium hydroxide with a substance giving sulfuric acid radicals, burning the treated material at a temperature of from 550 to 800°C; impregnating the resultant burned material with a palladium compound, a palladium compound and a platinum compound, or a nickel compound; and burning the impregnated material at a temperature of from 300 to 700°C;

(3) kneading a zirconium hydroxide, a substance giving sulfuric acid radicals, and a palladium compound, a palladium compound and a platinum compound, or a nickel compound; and burning the mixture at a temperature of from 550 to 800°C; or

(4) kneading a zirconium hydroxide and a substance giving sulfuric acid radicals; burning the mixture at a temperature of from 550 to 800°C; impregnating the resultant burned material with a palladium compound, a palladium compound and a platinum compound, or a nickel compound; and burning the impregnated material at a temperature of from 300 to 700°C.

4. A method for the hydrodesulfurization and isomerization of a light hydrocarbon oil, comprising bringing a light hydrocarbon oil having a sulfur content of

700 ppm by weight or lower and hydrogen into contact with the catalyst composition of claim 1 under reaction conditions of a temperature of from 140 to 400°C, a pressure of from 1.0 to 4.5 MPa, an LHSV of from 1.0 to 10 h⁻¹, and an H₂/oil ratio of from 1 to 3 mol/mol.

5. The method according to claim 4, wherein the ratio of the platinum to the palladium (Pt/Pd atomic ratio) in the catalyst composition is from 0.1 to 4.

6. Use of the catalyst composition of claim 1 or 2 for the hydrodesulfurization and isomerization of a light hydrocarbon oil.

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